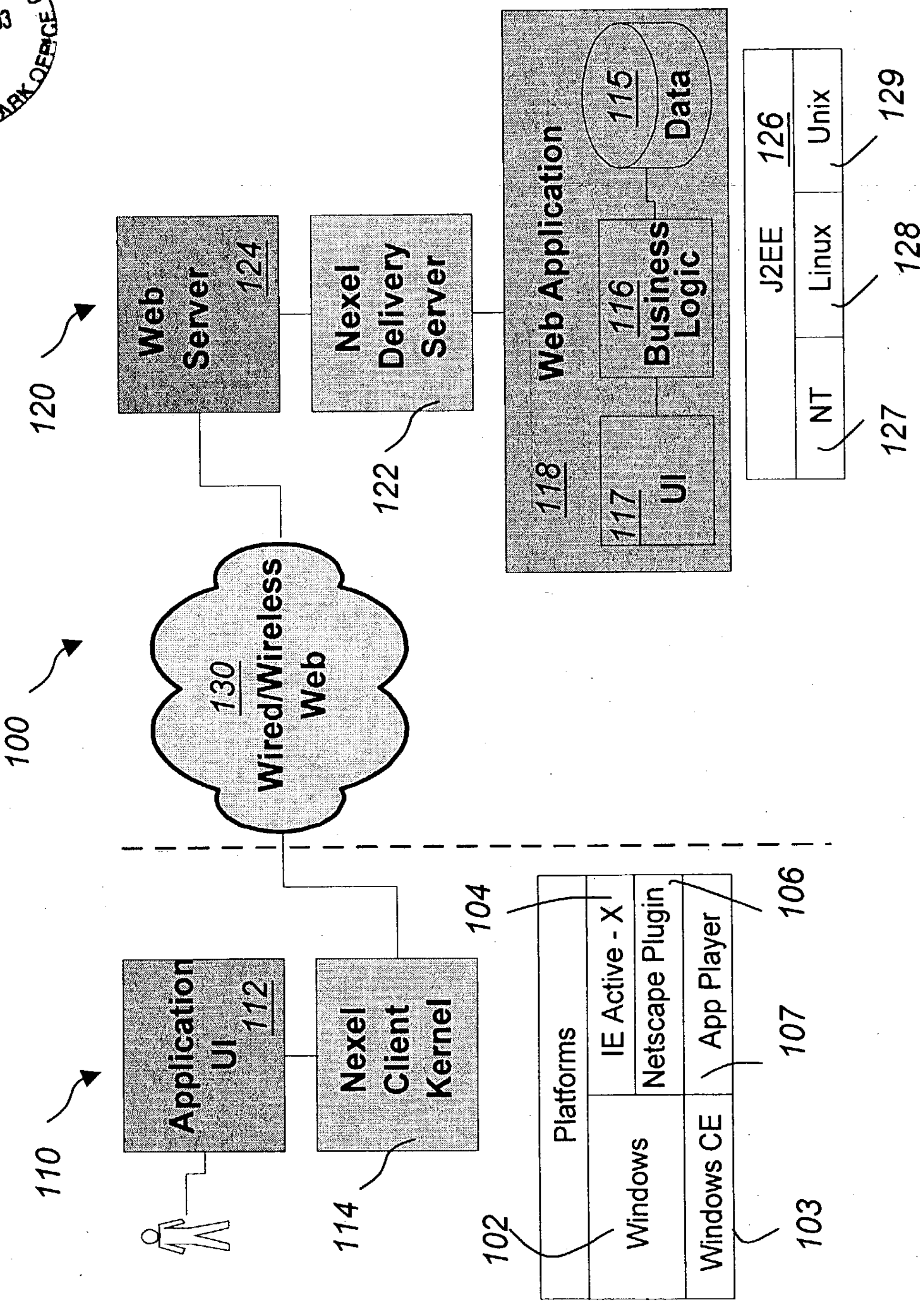

100
110
Application UI 112
Nexel Client Kernel
114
Platforms
Windows
Windows CE
IE Active - X
Netscape Plugin
App Player
102
103
104
106
107
130 Wired/Wireless Web
120
Web Server 124
Nexel Delivery Server
122
118 Web Application
117 UI
116 Business Logic
115 Data
J2EE 126
NT
Linux
Unix
127
128
129

FIG. 1

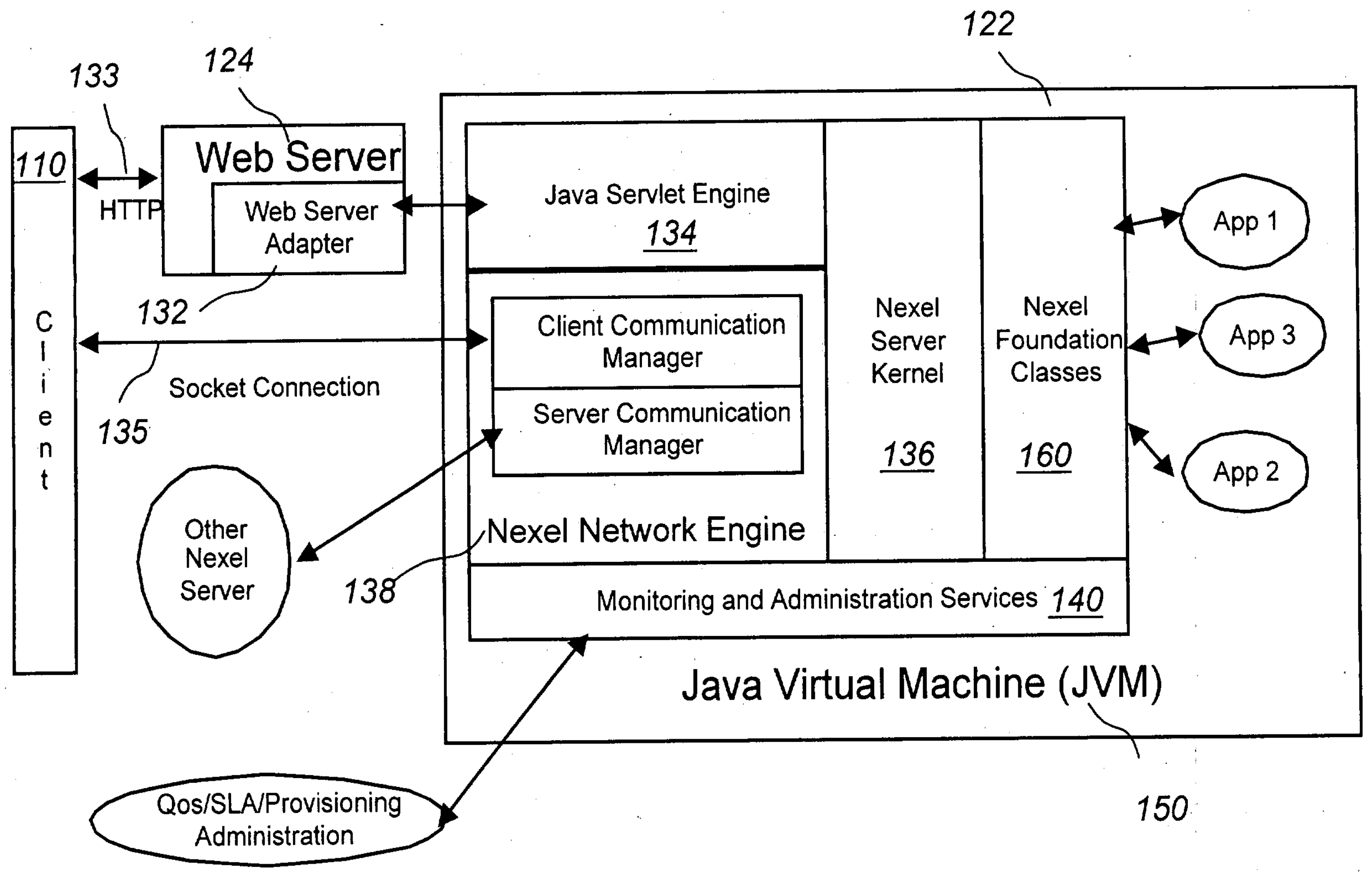
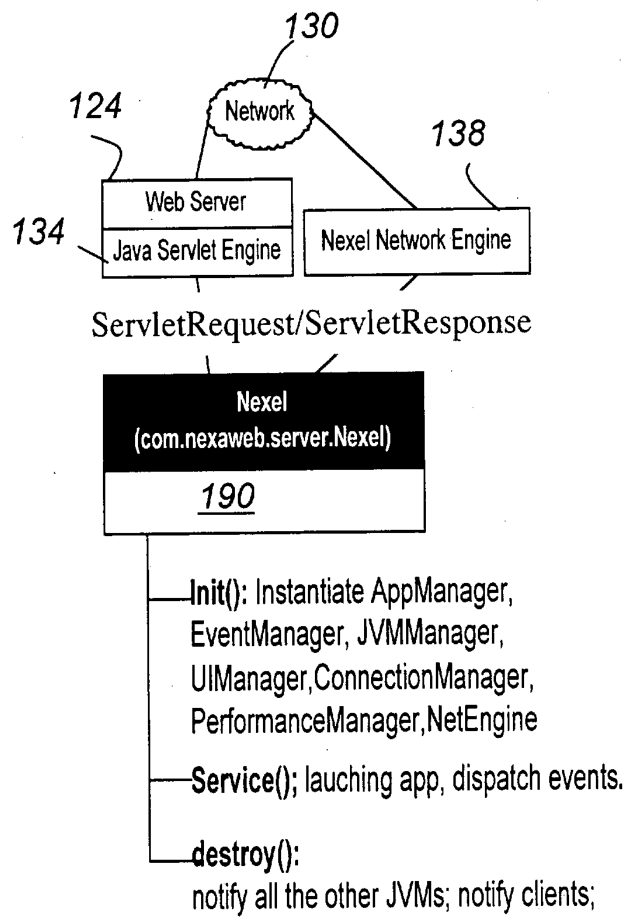

122
124
133
110
Client
Web Server
Web Server Adapter
HTTP
132
Socket Connection
135
Java Servlet Engine 134
Client Communication Manager
Server Communication Manager
Nexel Network Engine
138
Nexel Server Kernel 136
Nexel Foundation Classes 160
Monitoring and Administration Services 140
Java Virtual Machine (JVM)
150
App 1
App 3
App 2
Other Nexel Server
Qos/SLA/Provisioning Administration

FIG. 2


130
Network
124
Web Server
134
Java Servlet Engine
138
Nexel Network Engine
ServletRequest/ServletResponse
Nexel
(com.nexaweb.server.Nexel)
190
Init(): Instantiate AppManager, EventManager, JVMManager, UIManager,ConnectionManager, PerformanceManager,NetEngine
Service(); lauching app, dispatch events.
destroy():
notify all the other JVMs; notify clients;

Nexel.Service(ServletRequest, ServletResponse):

```
store SevletResponse to ConnectionManager;
inspect request:
        if(JVM!=thisJVM)
                pass request to NetEngine;
        else {
          if(appname!=null) {
            if(PerformaneManager.isOverLoaded())
                pass request to NetEngine;
            else launchApp();
          }
          else dispatchEvent().
        }
remove SevletResponse from ConnectionManager;
```

FIG. 3

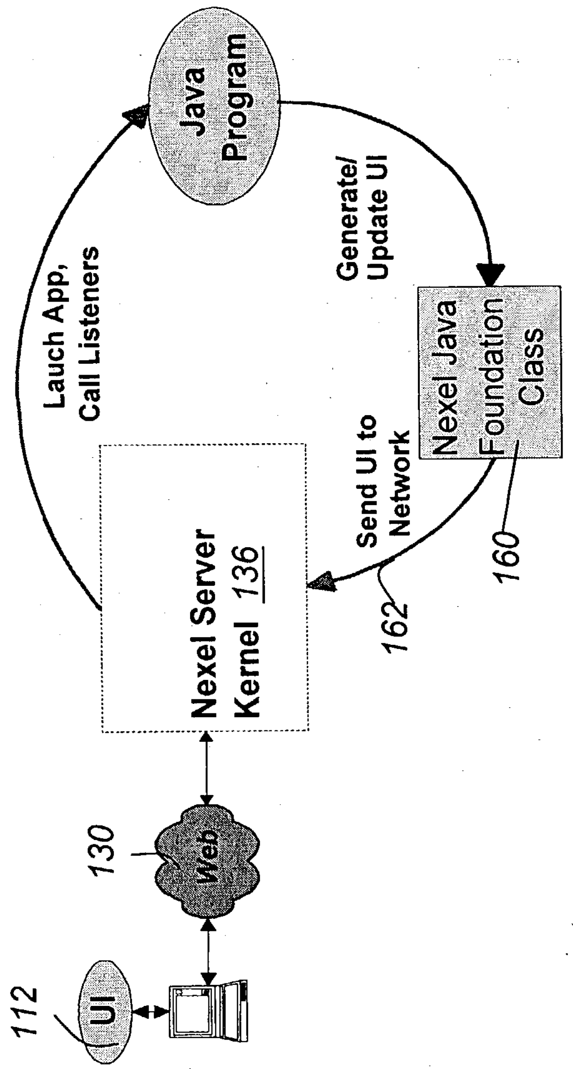

Java Program
Generate/ Update UI
Nexel Java Foundation Class
160
Send UI to Network
162
Nexel Server Kernel 136
Lauch App, Call Listeners
Web
130
UI
112

FIG. 4

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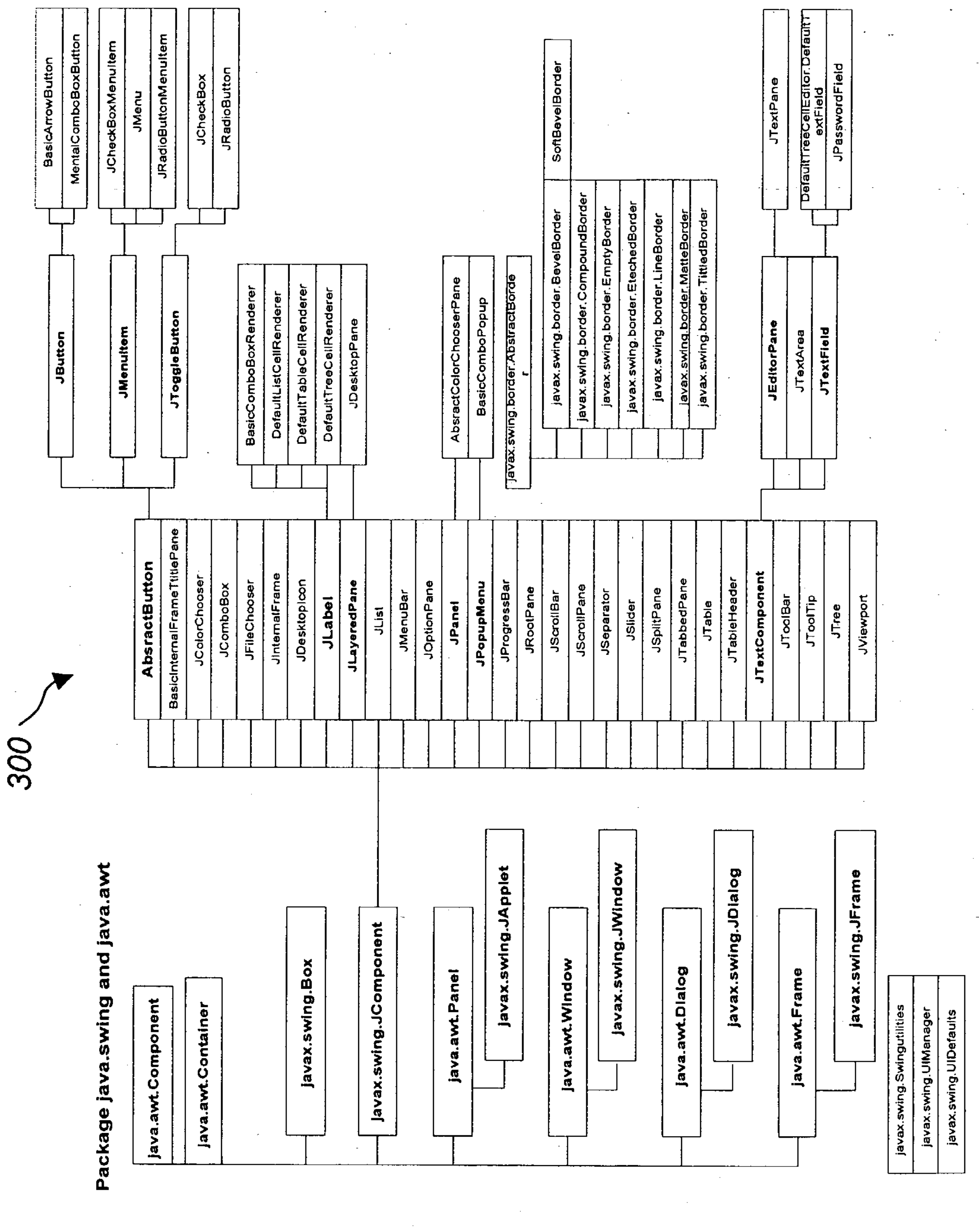

FIG. 5

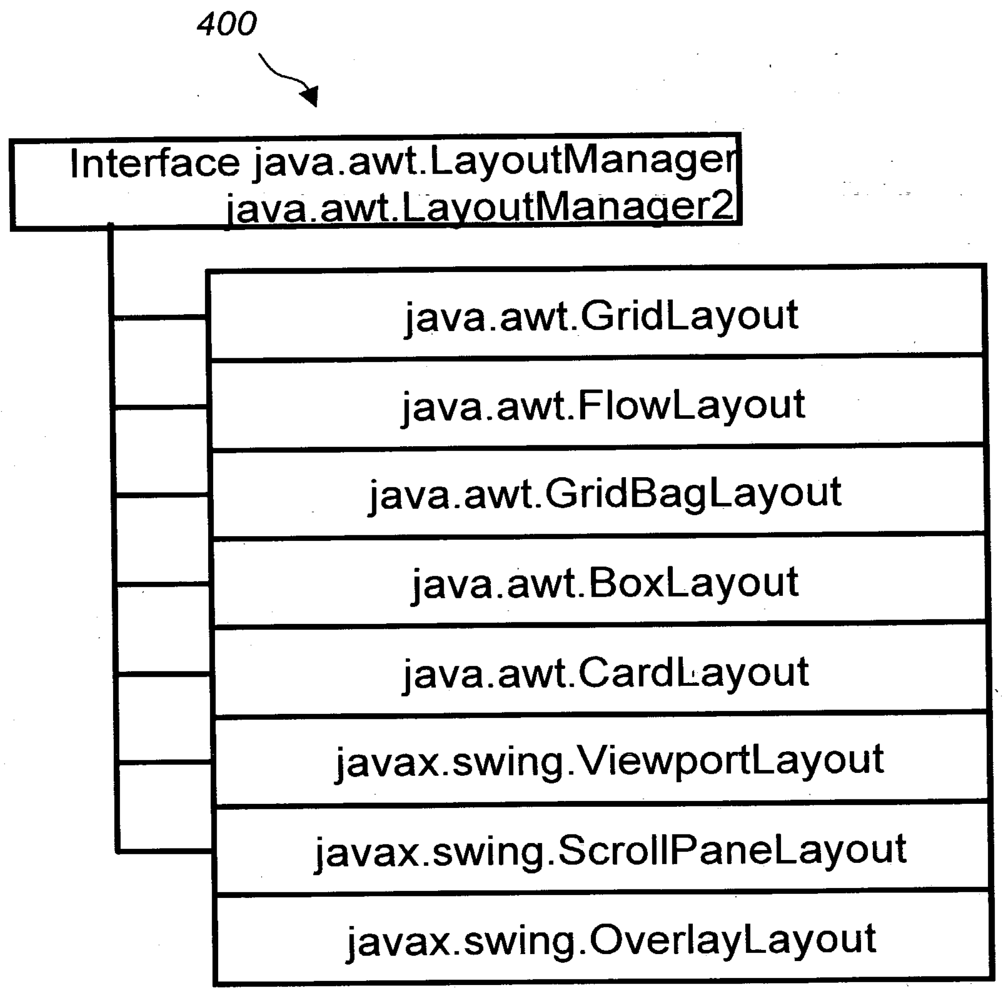
400
Interface java.awt.LayoutManager
java.awt.LayoutManager2
java.awt.GridLayout
java.awt.FlowLayout
java.awt.GridBagLayout
java.awt.BoxLayout
java.awt.CardLayout
javax.swing.ViewportLayout
javax.swing.ScrollPaneLayout
javax.swing.OverlayLayout

FIG. 6

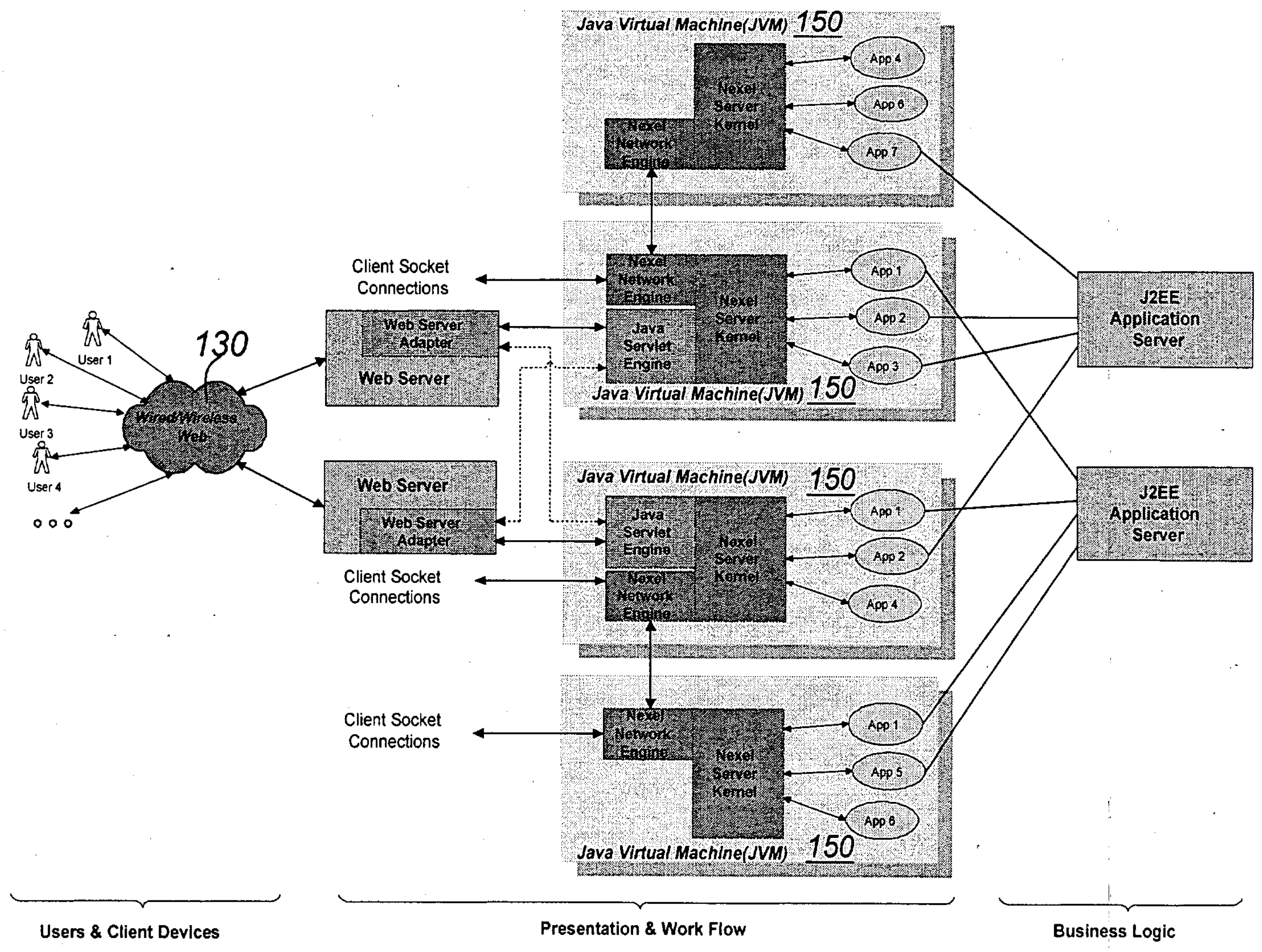
Java Virtual Machine(JVM) 150
Nexel Network Engine
Nexel Server Kernel
Java Servlet Engine
App 1
App 2
App 3
App 4
App 5
App 6
App 7
App 8
J2EE Application Server
Client Socket Connections
Web Server Adapter
Web Server
Wired/Wireless Web
130
User 1
User 2
User 3
User 4
Users & Client Devices
Presentation & Work Flow
Business Logic

FIG. 7

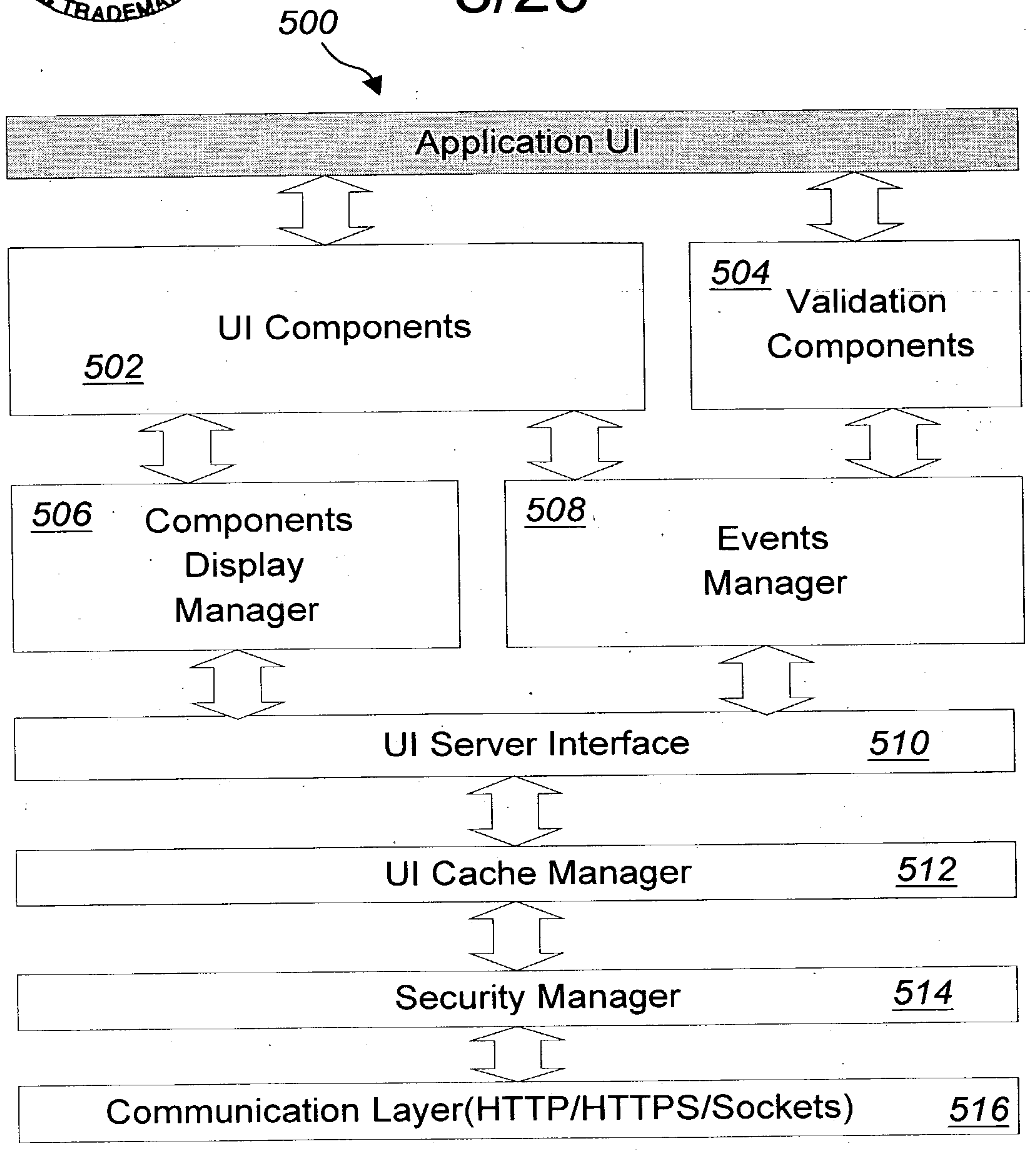
500
Application UI
UI Components
502
504
Validation Components
506
Components Display Manager
508
Events Manager
UI Server Interface
510
UI Cache Manager
512
Security Manager
514
Communication Layer(HTTP/HTTPS/Sockets)
516

FIG. 8

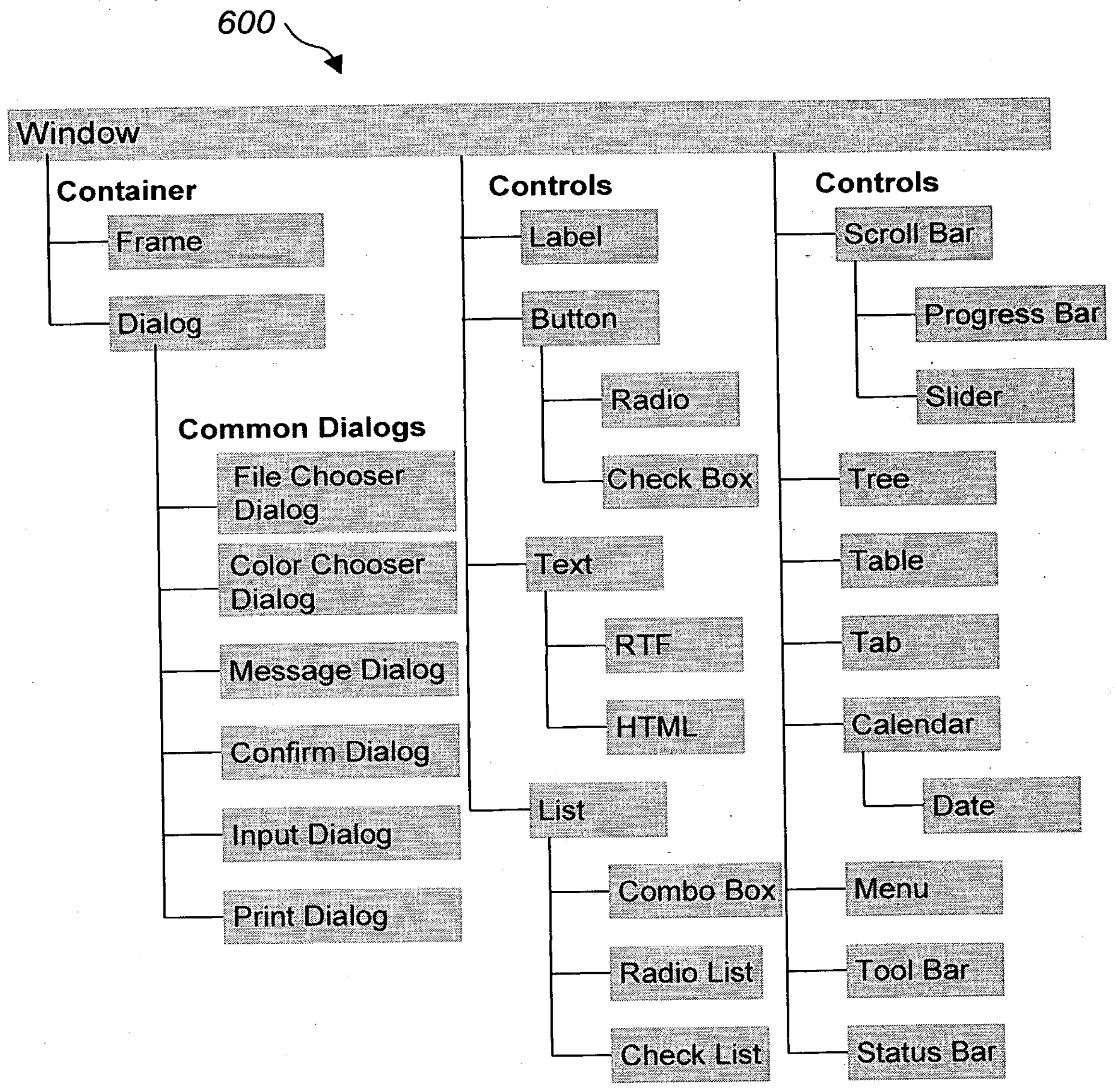
600
Window
Container
Frame
Dialog
Common Dialogs
File Chooser Dialog
Color Chooser Dialog
Message Dialog
Confirm Dialog
Input Dialog
Print Dialog
Controls
Label
Button
Radio
Check Box
Text
RTF
HTML
List
Combo Box
Radio List
Check List
Controls
Scroll Bar
Progress Bar
Slider
Tree
Table
Tab
Calendar
Date
Menu
Tool Bar
Status Bar

FIG. 9

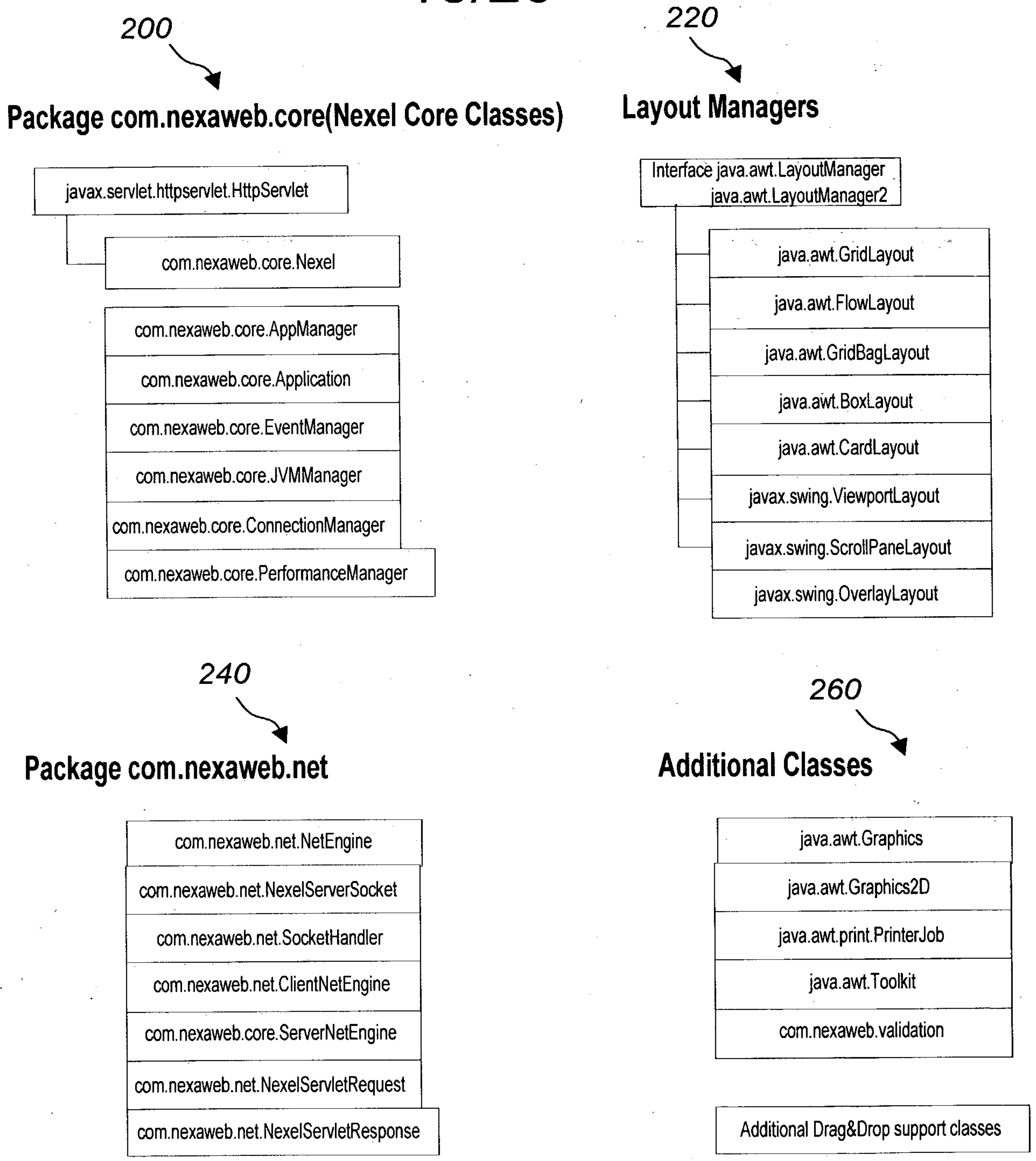
200
Package com.nexaweb.core(Nexel Core Classes)
javax.servlet.httpservlet.HttpServlet
com.nexaweb.core.Nexel
com.nexaweb.core.AppManager
com.nexaweb.core.Application
com.nexaweb.core.EventManager
com.nexaweb.core.JVMManager
com.nexaweb.core.ConnectionManager
com.nexaweb.core.PerformanceManager
220
Layout Managers
Interface java.awt.LayoutManager
java.awt.LayoutManager2
java.awt.GridLayout
java.awt.FlowLayout
java.awt.GridBagLayout
java.awt.BoxLayout
java.awt.CardLayout
javax.swing.ViewportLayout
javax.swing.ScrollPaneLayout
javax.swing.OverlayLayout
240
Package com.nexaweb.net
com.nexaweb.net.NetEngine
com.nexaweb.net.NexelServerSocket
com.nexaweb.net.SocketHandler
com.nexaweb.net.ClientNetEngine
com.nexaweb.core.ServerNetEngine
com.nexaweb.net.NexelServletRequest
com.nexaweb.net.NexelServletResponse
260
Additional Classes
java.awt.Graphics
java.awt.Graphics2D
java.awt.print.PrinterJob
java.awt.Toolkit
com.nexaweb.validation
Additional Drag&Drop support classes

FIG. 10

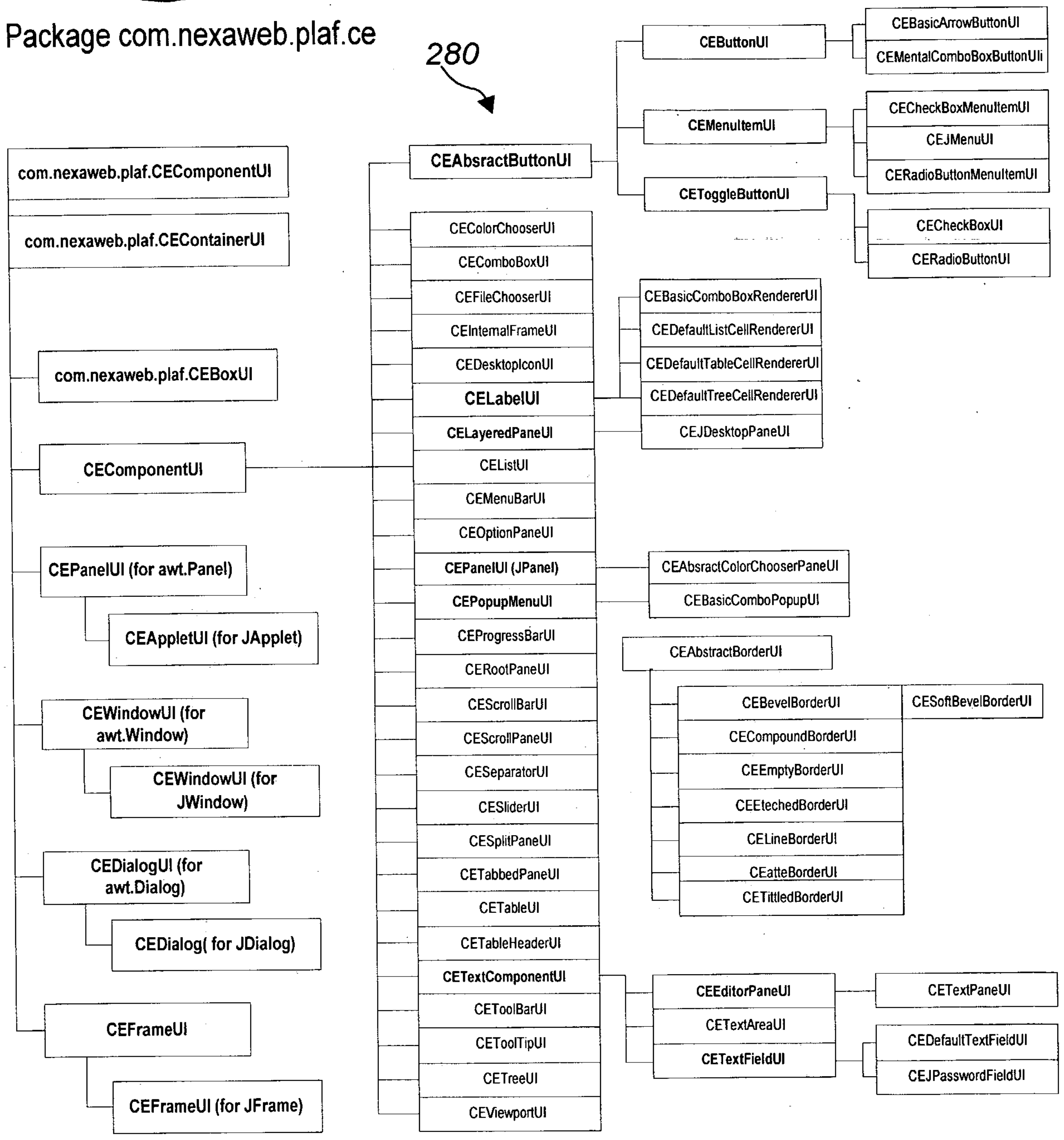
Package com.nexaweb.plaf.ce
280
com.nexaweb.plaf.CEComponentUI
com.nexaweb.plaf.CEContainerUI
com.nexaweb.plaf.CEBoxUI
CEComponentUI
CEPanelUI (for awt.Panel)
CEAppletUI (for JApplet)
CEWindowUI (for awt.Window)
CEWindowUI (for JWindow)
CEDialogUI (for awt.Dialog)
CEDialog(for JDialog)
CEFrameUI
CEFrameUI (for JFrame)
CEAbsractButtonUI
CEColorChooserUI
CEComboBoxUI
CEFileChooserUI
CEInternalFrameUI
CEDesktopIconUI
CELabelUI
CELayeredPaneUI
CEListUI
CEMenuBarUI
CEOptionPaneUI
CEPanelUI (JPanel)
CEPopupMenuUI
CEProgressBarUI
CERootPaneUI
CEScrollBarUI
CEScrollPaneUI
CESeparatorUI
CESliderUI
CESplitPaneUI
CETabbedPaneUI
CETableUI
CETableHeaderUI
CETextComponentUI
CEToolBarUI
CEToolTipUI
CETreeUI
CEViewportUI
CEButtonUI
CEBasicArrowButtonUI
CEMentalComboBoxButtonUIi
CEMenuItemUI
CECheckBoxMenuItemUI
CEJMenuUI
CERadioButtonMenuItemUI
CEToggleButtonUI
CECheckBoxUI
CERadioButtonUI
CEBasicComboBoxRendererUI
CEDefaultListCellRendererUI
CEDefaultTableCellRendererUI
CEDefaultTreeCellRendererUI
CEJDesktopPaneUI
CEAbsractColorChooserPaneUI
CEBasicComboPopupUI
CEAbstractBorderUI
CEBevelBorderUI
CESoftBevelBorderUI
CECompoundBorderUI
CEEmptyBorderUI
CEEtechedBorderUI
CELineBorderUI
CEatteBorderUI
CETittledBorderUI
CEEditorPaneUI
CETextPaneUI
CETextAreaUI
CETextFieldUI
CEDefaultTextFieldUI
CEJPasswordFieldUI

FIG. 11

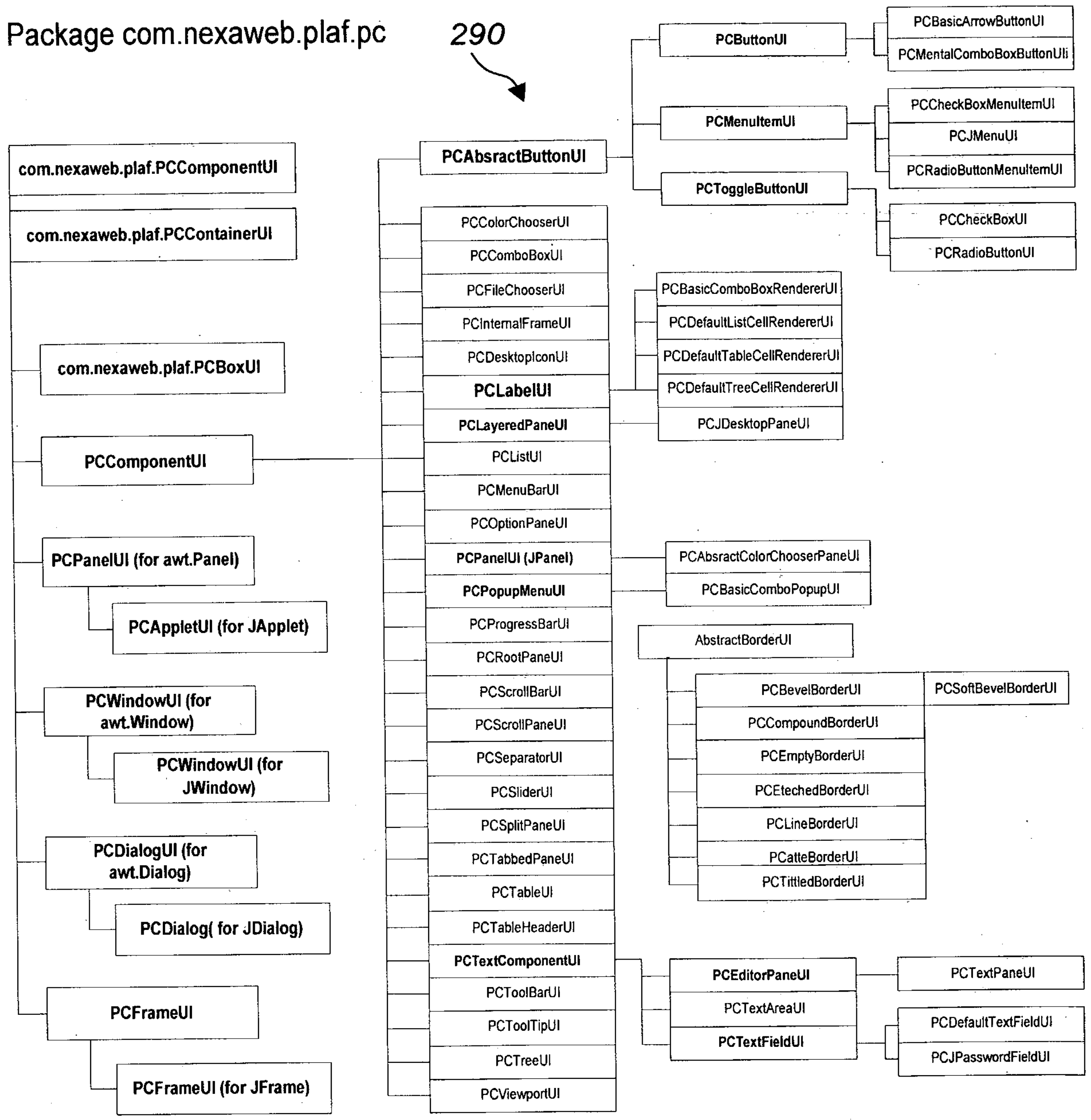
Package com.nexaweb.plaf.pc
290
com.nexaweb.plaf.PCComponentUI
com.nexaweb.plaf.PCContainerUI
com.nexaweb.plaf.PCBoxUI
PCComponentUI
PCPanelUI (for awt.Panel)
PCAppletUI (for JApplet)
PCWindowUI (for awt.Window)
PCWindowUI (for JWindow)
PCDialogUI (for awt.Dialog)
PCDialog(for JDialog)
PCFrameUI
PCFrameUI (for JFrame)
PCAbsractButtonUI
PCButtonUI
PCBasicArrowButtonUI
PCMentalComboBoxButtonUI
PCMenuItemUI
PCCheckBoxMenuItemUI
PCJMenuUI
PCRadioButtonMenuItemUI
PCToggleButtonUI
PCCheckBoxUI
PCRadioButtonUI
PCColorChooserUI
PCComboBoxUI
PCFileChooserUI
PCInternalFrameUI
PCDesktopIconUI
PCLabelUI
PCBasicComboBoxRendererUI
PCDefaultListCellRendererUI
PCDefaultTableCellRendererUI
PCDefaultTreeCellRendererUI
PCLayeredPaneUI
PCJDesktopPaneUI
PCListUI
PCMenuBarUI
PCOptionPaneUI
PCPanelUI (JPanel)
PCAbsractColorChooserPaneUI
PCPopupMenuUI
PCBasicComboPopupUI
PCProgressBarUI
PCRootPaneUI
AbstractBorderUI
PCScrollBarUI
PCBevelBorderUI
PCSoftBevelBorderUI
PCScrollPaneUI
PCCompoundBorderUI
PCSeparatorUI
PCEmptyBorderUI
PCSliderUI
PCEtechedBorderUI
PCSplitPaneUI
PCLineBorderUI
PCTabbedPaneUI
PCatteBorderUI
PCTittledBorderUI
PCTableUI
PCTableHeaderUI
PCTextComponentUI
PCEditorPaneUI
PCTextPaneUI
PCTextAreaUI
PCTextFieldUI
PCDefaultTextFieldUI
PCJPasswordFieldUI
PCToolBarUI
PCToolTipUI
PCTreeUI
PCViewportUI

FIG. 12

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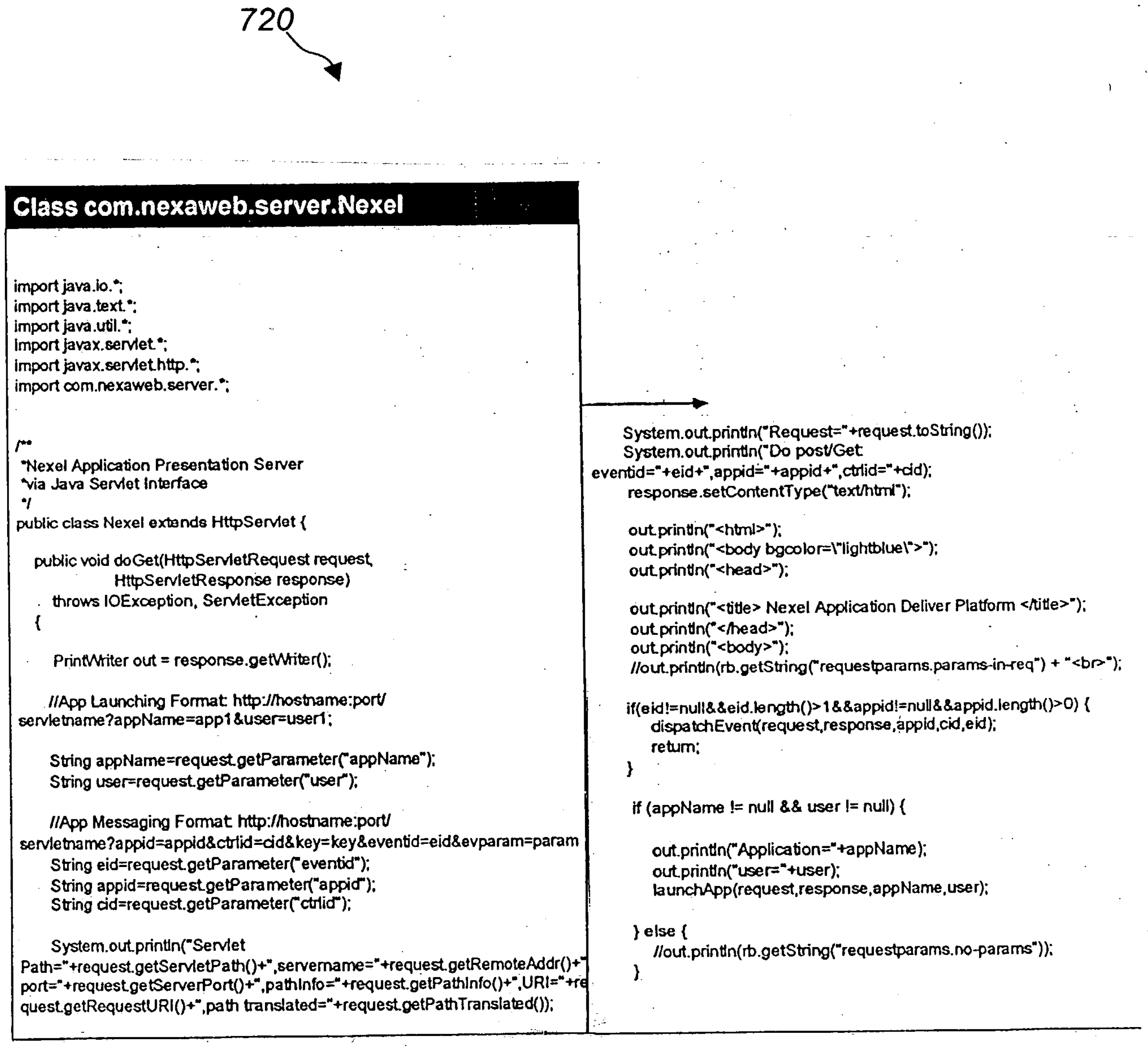
Class com.nexaweb.server.ConnectionManager

```
package com.nexaweb.server;

import java.lang.*;
import java.lang.reflect.*;
import java.util.*;
import java.io.*;
import java.text.*;
import java.awt.event.*;
import java.awt.*;

import javax.servlet.*;
import javax.servlet.http.*;

public class HttpManager {

protected static Hashtable threadList=new Hashtable();

 public  HttpManager() {return;}


public synchronized static void put(String tname, ServletResponse httpResponse)
 {
  threadList.put(tname,httpResponse);
 }

 public synchronized static void remove(String tname)
 {
  System.out.println("Removing entry for "+tname);
  threadList.remove(tname);
 }

 public synchronized static void remove()
 {Thread th=Thread.currentThread();
 String name=th.getName();
 threadList.remove(name);
 }

 private static Object getConnection(String tname) {
  System.out.println("Get connection:threadList="+threadList+",name="+tname);

  Object o=threadList.get(tname);
  System.out.println("Get connection:threadList="+threadList+",connection="+o);
  return o;
 }
```

```
public static Object getConnection() {
 Thread th=Thread.currentThread();
 String name=null;
 if(th instanceof AppServiceThread) {
   /**
    *in this case, the connection is stored into HttpManager in a parent thread
    *, and the retrieving happens in a child thread
    */
     AppServiceThread ath=(AppServiceThread)th;
     name=ath.getParentThreadName();
     System.out.println("this is an AppServiceThread: parentName="+name);
 }
 else name=th.getName();
 System.out.println("Tring to get connection by thread name="+name);
 Object oo=getConnection(name);
 /*Object po=oo;
   for(int i=0;true;) {break;
        if(po==null) break;
        System.out.println("Class is: "+po.getClass().getName()+"\n");
         po=po.getClass().getSuperclass();
     }
   */

 try {
 System.out.println("HttpManager:get connection:
="+oo+",oo.class="+oo.getClass().getName());
 }catch(Exception ee) {System.out.println("Exception in HTTPManager:"+ee);}
 return oo;
}

}
```

FIG. 13

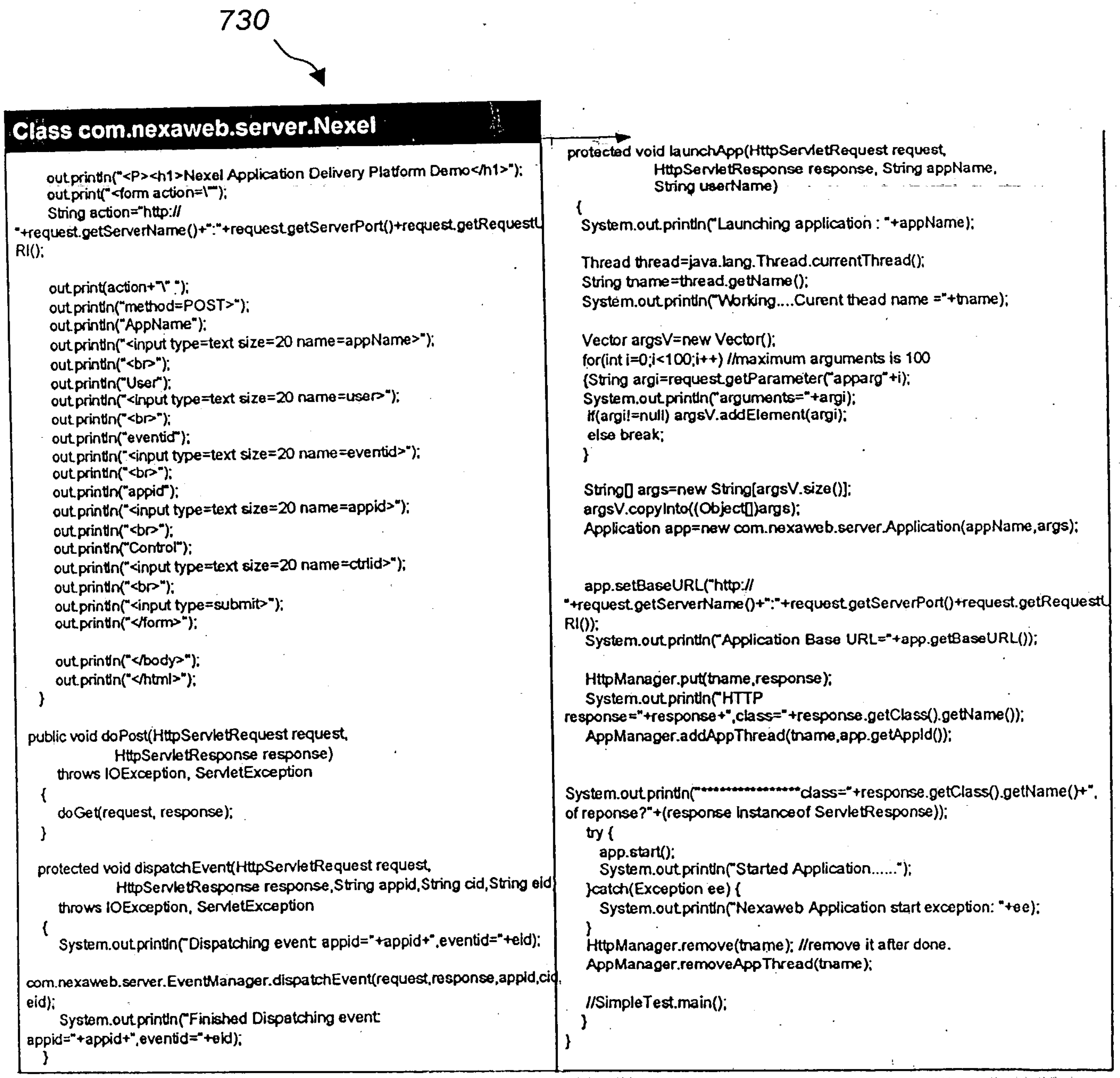


Class com.nexaweb.server.Nexel

```
import java.io.*;
import java.text.*;
import java.util.*;
import javax.servlet.*;
import javax.servlet.http.*;
import com.nexaweb.server.*;


/**
 *Nexel Application Presentation Server
 *via Java Servlet Interface
 */
public class Nexel extends HttpServlet {

   public void doGet(HttpServletRequest request,
               HttpServletResponse response)
    throws IOException, ServletException
   {

     PrintWriter out = response.getWriter();

    //App Launching Format: http://hostname:port/
servletname?appName=app1&user=user1;

     String appName=request.getParameter("appName");
     String user=request.getParameter("user");

     //App Messaging Format: http://hostname:port/
servletname?appid=appid&ctrlid=cid&key=key&eventid=eid&evparam=param
     String eid=request.getParameter("eventid");
     String appid=request.getParameter("appid");
     String cid=request.getParameter("ctrlid");

     System.out.println("Servlet
Path="+request.getServletPath()+",servername="+request.getRemoteAddr()+"
port="+request.getServerPort()+",pathInfo="+request.getPathInfo()+",URI="+re
quest.getRequestURI()+",path translated="+request.getPathTranslated());
```

```
    System.out.println("Request="+request.toString());
    System.out.println("Do post/Get
eventid="+eid+",appid="+appid+",ctrlid="+cid);
     response.setContentType("text/html");

     out.println("<html>");
     out.println("<body bgcolor=\"lightblue\">");
     out.println("<head>");

     out.println("<title> Nexel Application Deliver Platform </title>");
     out.println("</head>");
     out.println("<body>");
     //out.println(rb.getString("requestparams.params-in-req") + "<br>");

    if(eid!=null&&eid.length()>1&&appid!=null&&appid.length()>0) {
        dispatchEvent(request,response,appid,cid,eid);
        return;
    }

     if (appName != null && user != null) {

        out.println("Application="+appName);
        out.println("user="+user);
        launchApp(request,response,appName,user);

     } else {
        //out.println(rb.getString("requestparams.no-params"));
     }
```

FIG. 14



Class com.nexaweb.server.Nexel

```
      out.println("<P><h1>Nexel Application Delivery Platform Demo</h1>");
      out.print("<form action=\"");
      String action="http://
"+request.getServerName()+":"+request.getServerPort()+request.getRequestU
RI();

      out.print(action+"\" ");
      out.println("method=POST>");
      out.println("AppName");
      out.println("<input type=text size=20 name=appName>");
      out.println("<br>");
      out.println("User");
      out.println("<input type=text size=20 name=user>");
      out.println("<br>");
      out.println("eventid");
      out.println("<input type=text size=20 name=eventid>");
      out.println("<br>");
      out.println("appid");
      out.println("<input type=text size=20 name=appid>");
      out.println("<br>");
      out.println("Control");
      out.println("<input type=text size=20 name=ctrlid>");
      out.println("<br>");
      out.println("<input type=submit>");
      out.println("</form>");

      out.println("</body>");
      out.println("</html>");
  }

public void doPost(HttpServletRequest request,
            HttpServletResponse response)
    throws IOException, ServletException
  {
    doGet(request, response);
  }

  protected void dispatchEvent(HttpServletRequest request,
            HttpServletResponse response,String appid,String cid,String eid)
    throws IOException, ServletException
  {
    System.out.println("Dispatching event: appid="+appid+",eventid="+eid);

com.nexaweb.server.EventManager.dispatchEvent(request,response,appid,cid,
eid);
     System.out.println("Finished Dispatching event:
appid="+appid+",eventid="+eid);
   }
```

```
protected void launchApp(HttpServletRequest request,
            HttpServletResponse response, String appName,
            String userName)
 {
  System.out.println("Launching application : "+appName);

  Thread thread=java.lang.Thread.currentThread();
  String tname=thread.getName();
  System.out.println("Working....Curent thead name ="+tname);

  Vector argsV=new Vector();
  for(int i=0;i<100;i++) //maximum arguments is 100
  {String argi=request.getParameter("apparg"+i);
  System.out.println("arguments="+argi);
   if(argi!=null) argsV.addElement(argi);
   else break;
  }

  String[] args=new String[argsV.size()];
  argsV.copyInto((Object[])args);
  Application app=new com.nexaweb.server.Application(appName,args);


  app.setBaseURL("http://
"+request.getServerName()+":"+request.getServerPort()+request.getRequestU
RI());
  System.out.println("Application Base URL="+app.getBaseURL());

  HttpManager.put(tname,response);
  System.out.println("HTTP
response="+response+",class="+response.getClass().getName());
  AppManager.addAppThread(tname,app.getAppId());


System.out.println("****************class="+response.getClass().getName()+",
of reponse?"+(response Instanceof ServletResponse));
  try {
    app.start();
    System.out.println("Started Application......");
  }catch(Exception ee) {
    System.out.println("Nexaweb Application start exception: "+ee);
  }
  HttpManager.remove(tname); //remove it after done.
  AppManager.removeAppThread(tname);

  //SimpleTest.main();
 }
}
```

FIG. 15

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Class com.nexaweb.server.AppManager

```
package com.nexaweb.server;

import java.lang.*;
import java.lang.reflect.*;
import java.util.*;
import java.io.*;
import java.text.*;
import java.awt.event.*;
import java.awt.*;

import javax.servlet.*;
import javax.servlet.http.*;

/**
 * class to hold all application instances
 */
public class AppManager extends java.lang.Object {

 protected static int appCount=0;
 protected static Hashtable appTable=new Hashtable();
 protected static Hashtable appThreads=new Hashtable();

 public AppManager() {return;}

 public static String createNewAppId() {
    appCount++;
    return "Nx"+appCount+System.currentTimeMillis();
    }


 public synchronized static void addApp(Application app)
 { String key=app.getAppId();
   appTable.put(key, app);
 }


 public synchronized static void addAppThread(String tname,String appId) {
  appThreads.put(tname,appid);
 }

 public synchronized static void removeAppThread( String tname) {
  appThreads.remove(tname);
 }
```

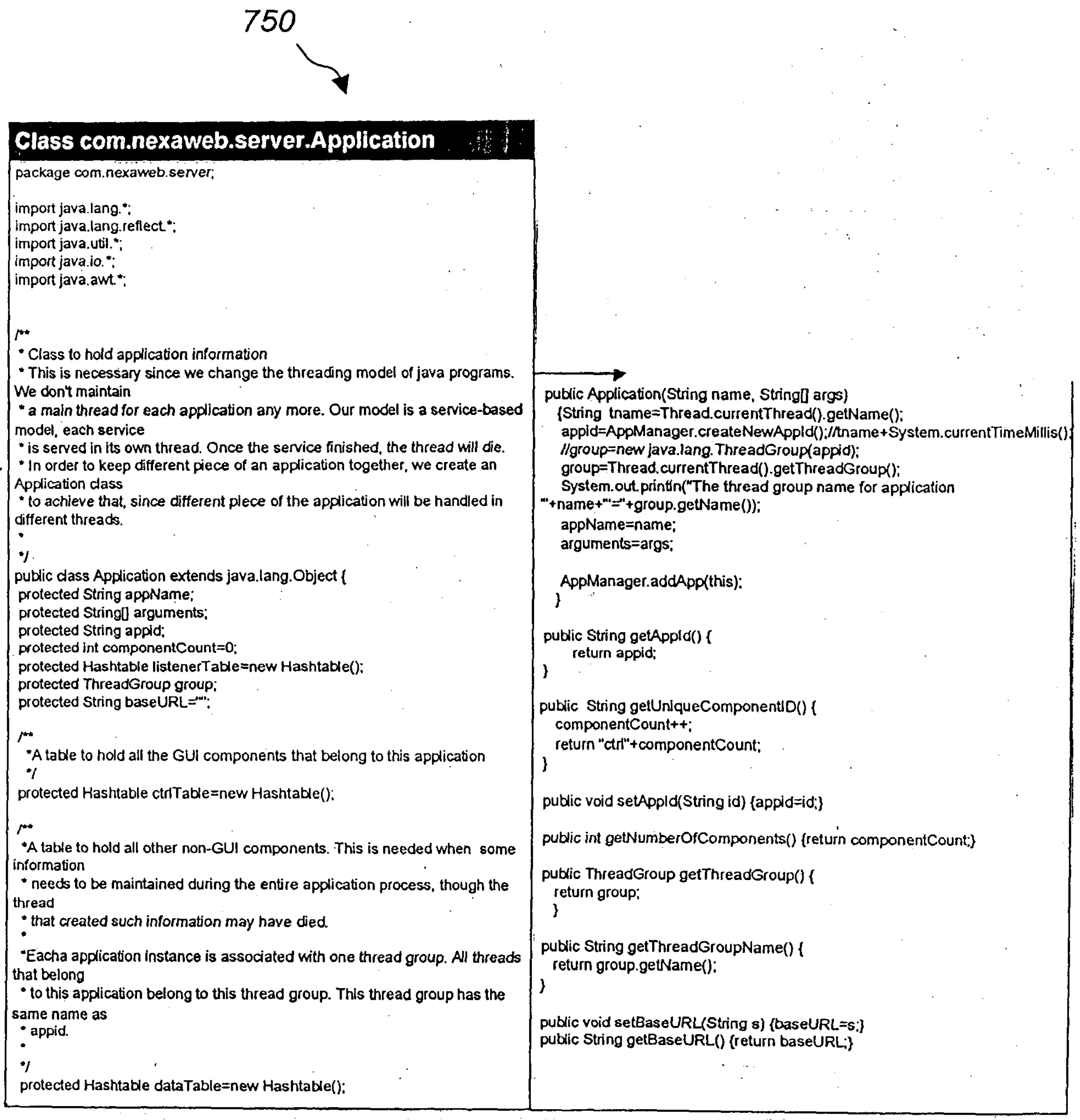
```
public synchronized static void removeApp(String appid)
{ Object app=appTable.get(appid); app=null;
  appTable.remove(appid);
 //appThreads.remove(appid);
}

public  static Application getApplication(String appid)
{ if(appid==null) return null;
  Object app=appTable.get(appid);
  return (Application)app;
}

public static Application getApplication()
{
  //System.out.println("Get application");
  Thread th=Thread.currentThread();
  String tname=th.getName();
  //System.out.println("Thread name="+tname);
  String appid=(String)appThreads.get(tname);
  //System.out.println("Application ID="+appid);
  return getApplication(appid);
}

/**
*a helper method to create a unique component ID for each compoent
*(The uniqueness is only within the scope of the application)
*/
public static String getUniqueComponentID() {
  Application app=getApplication();
  if(app==null) return "Can not find application";
  return app.getUniqueComponentID();
}
}
```

FIG. 16



Class com.nexaweb.server.Application

```
package com.nexaweb.server;

import java.lang.*;
import java.lang.reflect.*;
import java.util.*;
import java.io.*;
import java.awt.*;


/**
 * Class to hold application information
 * This is necessary since we change the threading model of java programs.
We don't maintain
 * a main thread for each application any more. Our model is a service-based
model, each service
 * is served in its own thread. Once the service finished, the thread will die.
 * In order to keep different piece of an application together, we create an
Application class
 * to achieve that, since different piece of the application will be handled in
different threads.
 *
 */
public class Application extends java.lang.Object {
 protected String appName;
 protected String[] arguments;
 protected String appid;
 protected int componentCount=0;
 protected Hashtable listenerTable=new Hashtable();
 protected ThreadGroup group;
 protected String baseURL="";

 /**
  *A table to hold all the GUI components that belong to this application
  */
 protected Hashtable ctrlTable=new Hashtable();

 /**
  *A table to hold all other non-GUI components. This is needed when  some
information
  * needs to be maintained during the entire application process, though the
thread
  * that created such information may have died.
  *
  *Eacha application instance is associated with one thread group. All threads
that belong
  * to this application belong to this thread group. This thread group has the
same name as
  * appid.
  *
  */
 protected Hashtable dataTable=new Hashtable();
```

```
public Application(String name, String[] args)
  {String tname=Thread.currentThread().getName();
   appid=AppManager.createNewAppId();//tname+System.currentTimeMillis();
   //group=new java.lang.ThreadGroup(appid);
   group=Thread.currentThread().getThreadGroup();
   System.out.println("The thread group name for application
"'+name+"'="+group.getName());
   appName=name;
   arguments=args;

   AppManager.addApp(this);
  }

public String getAppId() {
     return appid;
}

public  String getUniqueComponentID() {
  componentCount++;
  return "ctrl"+componentCount;
}

public void setAppId(String id) {appid=id;}

public int getNumberOfComponents() {return componentCount;}

public ThreadGroup getThreadGroup() {
  return group;
  }

public String getThreadGroupName() {
  return group.getName();
}

public void setBaseURL(String s) {baseURL=s;}
public String getBaseURL() {return baseURL;}
```

FIG. 17

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Class com.nexaweb.server.Application

```
 public synchronized void setApplicationVariable(String Id, Object ctrl)
 {

   if(ctrl instanceof java.awt.Component) {//need to add an ID field for
Component class
   // System.out.println("Putting CTRL="+id+", Object="+ctrl+" into the CTRL
table");
      ctrlTable.put(id,ctrl);
   }
 }

 public Object getApplicationVariable(String id)
 { return ctrlTable.get(id); }

 public void delApplicationVariable(String id)
 { ctrlTable.remove(id); }

 private  String getListenerKey(String ctrlid, String eid) {
   return ctrlid+eid;
 }

 public Vector getListeners(String ctrlid, String eventid) {
   String key=this.getListenerKey(ctrlid,eventid);
   Vector ls=(Vector)(listenerTable.get(key));
   return ls;
 }

/**
 *add a listener to be stored as application variable
 *@param ctrlid, the id of the source compoent of the event
 *@param eventid, the id of the event type
 *@param listener, the listener object, who contains methods for event
processing
 */
public synchronized void addListener(String ctrlid, String eventid, Object
listener) {
   String key=this.getListenerKey(ctrlid,eventid);
   Vector ls=(Vector)(listenerTable.get(key));
   if(ls==null) ls=new Vector();
   ls.addElement(listener);
   listenerTable.put(key,ls);
   //System.out.println("Add Listener to Application:
ctrlid="+ctrlid+",eventid="+eventid+",listener="+listener);
}
```

```
public synchronized void removeListener(String ctrlid, String eventid, Object
listener) {
   String key=this.getListenerKey(ctrlid,eventid);
   Vector ls=(Vector)(listenerTable.get(key));
   if(ls==null) return;
   ls.removeElement(listener);
   listenerTable.put(key,ls);
 }

 public void start() throws Exception
   {ClassLoader cl=this.getClass().getClassLoader();
    System.out.println("entry="+appName+",appid="+appid+",class
Loader="+cl);
    Class entry;
    if(cl!=null) entry=cl.loadClass(appName);
    else entry=Class.forName(appName);

    System.out.println("entry="+appName+","+entry);

    try {
      AppServiceThread thread=new AppServiceThread(this,entry,"main",null);
    System.out.println("thread="+thread);
    thread.run();
   }catch(Exception ex) {System.out.println("Application Start Exception:
"+ex);return;}

    /**
     * thread.start();
     *We can not use thread.start() here because if you spawn off a new thread
to do the processing,
     * the original servlet service thread will just return and die. As a result, it wi
close the
     * HttpResponse connection.
     */
   }
}
```

FIG. 18

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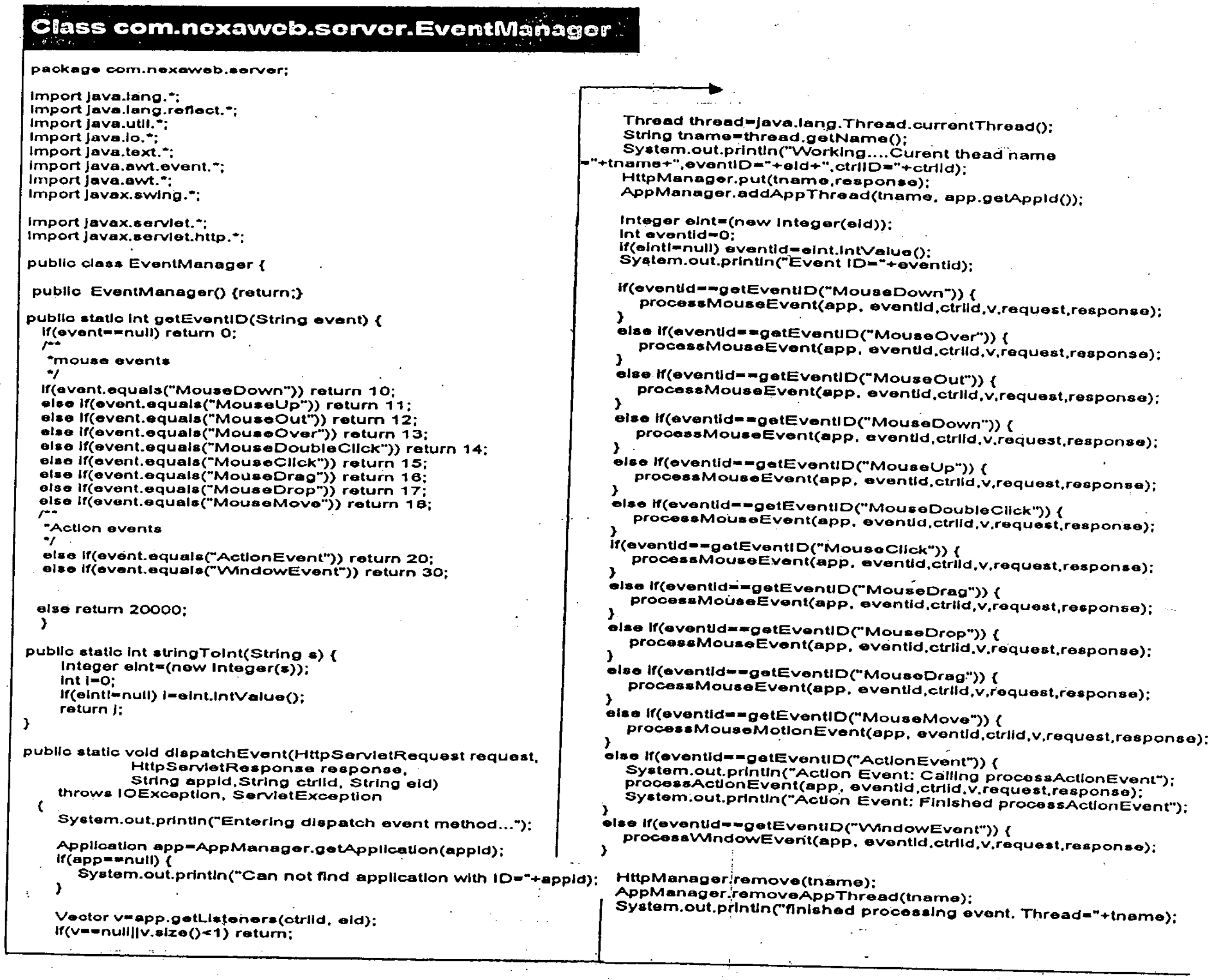

```
Class com.nexaweb.server.EventManager

package com.nexaweb.server;

import java.lang.*;
import java.lang.reflect.*;
import java.util.*;
import java.io.*;
import java.text.*;
import java.awt.event.*;
import java.awt.*;
import javax.swing.*;

import javax.servlet.*;
import javax.servlet.http.*;

public class EventManager {

 public  EventManager() {return;}

public static int getEventID(String event) {
  if(event==null) return 0;
  /**
   *mouse events
   */
  if(event.equals("MouseDown")) return 10;
  else if(event.equals("MouseUp")) return 11;
  else if(event.equals("MouseOut")) return 12;
  else if(event.equals("MouseOver")) return 13;
  else if(event.equals("MouseDoubleClick")) return 14;
  else if(event.equals("MouseClick")) return 15;
  else if(event.equals("MouseDrag")) return 16;
  else if(event.equals("MouseDrop")) return 17;
  else if(event.equals("MouseMove")) return 18;
  /**
   *Action events
   */
  else if(event.equals("ActionEvent")) return 20;
  else if(event.equals("WindowEvent")) return 30;


  else return 20000;
  }

public static int stringToInt(String s) {
     Integer eint=(new Integer(s));
     int i=0;
     if(eint!=null) i=eint.intValue();
     return i;
}

public static void dispatchEvent(HttpServletRequest request,
              HttpServletResponse response,
              String appid,String ctrlid, String eid)
   throws IOException, ServletException
  {
    System.out.println("Entering dispatch event method...");

    Application app=AppManager.getApplication(appid);
    if(app==null) {
       System.out.println("Can not find application with ID="+appid);
    }

    Vector v=app.getListeners(ctrlid, eid);
    if(v==null||v.size()<1) return;

      Thread thread=java.lang.Thread.currentThread();
      String tname=thread.getName();
      System.out.println("Working....Curent thead name
="+tname+",eventID="+eid+",ctrlID="+ctrlid);
     HttpManager.put(tname,response);
     AppManager.addAppThread(tname, app.getAppId());

     Integer eint=(new Integer(eid));
     int eventid=0;
     if(eint!=null) eventid=eint.intValue();
     System.out.println("Event ID="+eventid);

     if(eventid==getEventID("MouseDown")) {
        processMouseEvent(app, eventid,ctrlid,v,request,response);
     }
     else if(eventid==getEventID("MouseOver")) {
        processMouseEvent(app, eventid,ctrlid,v,request,response);
     }
     else if(eventid==getEventID("MouseOut")) {
        processMouseEvent(app, eventid,ctrlid,v,request,response);
     }
     else if(eventid==getEventID("MouseDown")) {
        processMouseEvent(app, eventid,ctrlid,v,request,response);
     }
     else if(eventid==getEventID("MouseUp")) {
        processMouseEvent(app, eventid,ctrlid,v,request,response);
     }
     else if(eventid==getEventID("MouseDoubleClick")) {
        processMouseEvent(app, eventid,ctrlid,v,request,response);
     }
     if(eventid==getEventID("MouseClick")) {
        processMouseEvent(app, eventid,ctrlid,v,request,response);
     }
     else if(eventid==getEventID("MouseDrag")) {
        processMouseEvent(app, eventid,ctrlid,v,request,response);
     }
     else if(eventid==getEventID("MouseDrop")) {
        processMouseEvent(app, eventid,ctrlid,v,request,response);
     }
     else if(eventid==getEventID("MouseDrag")) {
        processMouseEvent(app, eventid,ctrlid,v,request,response);
     }
     else if(eventid==getEventID("MouseMove")) {
        processMouseMotionEvent(app, eventid,ctrlid,v,request,response);
     }
     else if(eventid==getEventID("ActionEvent")) {
        System.out.println("Action Event: Calling processActionEvent");
        processActionEvent(app, eventid,ctrlid,v,request,response);
        System.out.println("Action Event: Finished processActionEvent");
     }
     else if(eventid==getEventID("WindowEvent")) {
        processWindowEvent(app, eventid,ctrlid,v,request,response);
     }

     HttpManager.remove(tname);
     AppManager.removeAppThread(tname);
     System.out.println("finished processing event. Thread="+tname);
```

FIG. 19

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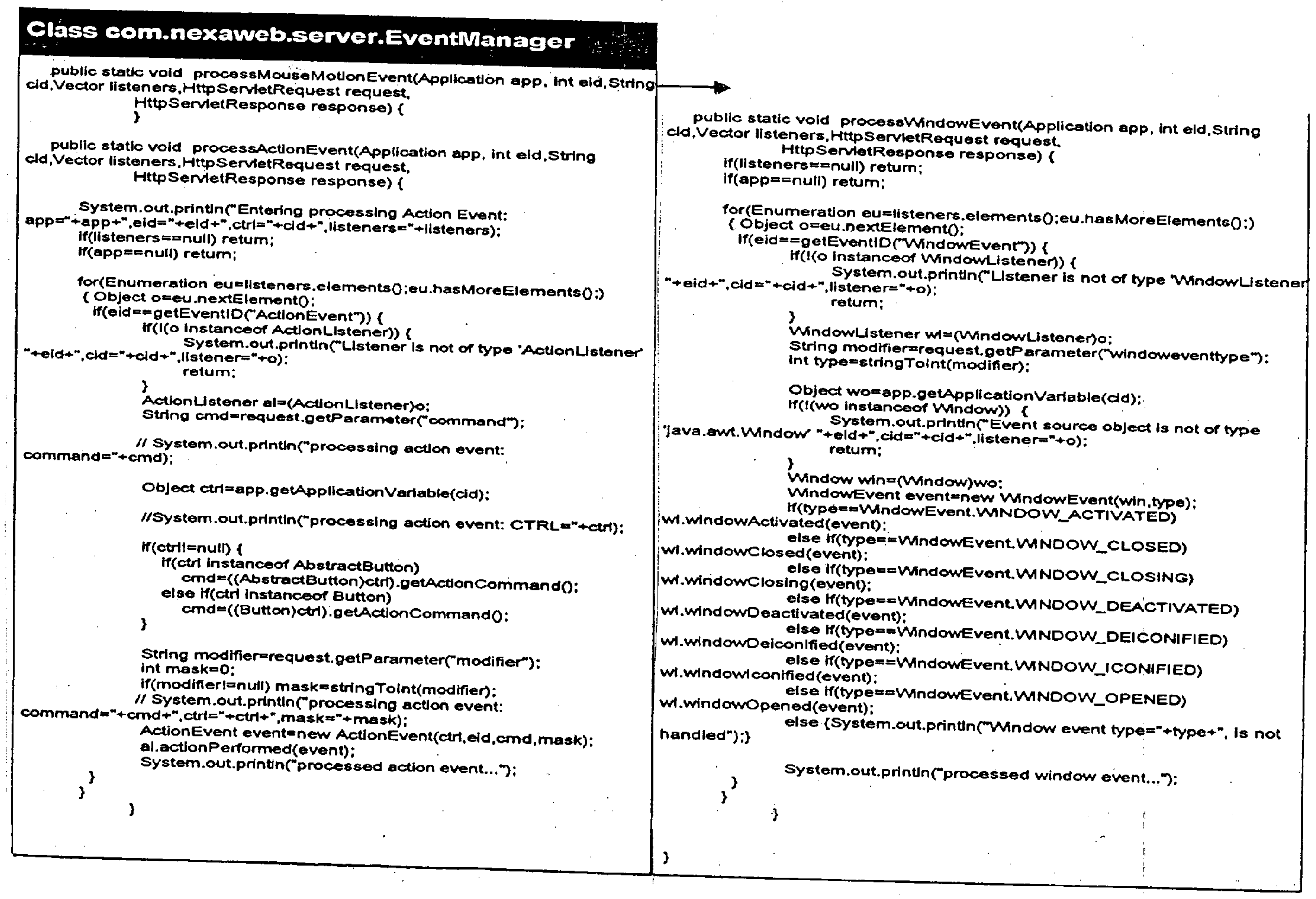

```
Class com.nexaweb.server.EventManager
    public static void  processMouseMotionEvent(Application app, int eid,String
cid,Vector listeners,HttpServletRequest request,
                HttpServletResponse response) {
                }

    public static void  processActionEvent(Application app, int eid,String
cid,Vector listeners,HttpServletRequest request,
                HttpServletResponse response) {

        System.out.println("Entering processing Action Event:
app="+app+",eid="+eid+",ctrl="+cid+",listeners="+listeners);
        if(listeners==null) return;
        if(app==null) return;

        for(Enumeration eu=listeners.elements();eu.hasMoreElements();)
         { Object o=eu.nextElement();
          if(eid==getEventID("ActionEvent")) {
                if(!(o instanceof ActionListener)) {
                    System.out.println("Listener is not of type 'ActionListener'
"+eid+",cid="+cid+",listener="+o);
                    return;
                }
                ActionListener al=(ActionListener)o;
                String cmd=request.getParameter("command");

               // System.out.println("processing action event:
command="+cmd);

                Object ctrl=app.getApplicationVariable(cid);

                //System.out.println("processing action event: CTRL="+ctrl);

                if(ctrl!=null) {
                    if(ctrl instanceof AbstractButton)
                        cmd=((AbstractButton)ctrl).getActionCommand();
                    else if(ctrl instanceof Button)
                        cmd=((Button)ctrl).getActionCommand();
                }

                String modifier=request.getParameter("modifier");
                int mask=0;
                if(modifier!=null) mask=stringToInt(modifier);
               // System.out.println("processing action event:
command="+cmd+",ctrl="+ctrl+",mask="+mask);
                ActionEvent event=new ActionEvent(ctrl,eid,cmd,mask);
                al.actionPerformed(event);
                System.out.println("processed action event...");
          }
        }
                }

    public static void  processWindowEvent(Application app, int eid,String
cid,Vector listeners,HttpServletRequest request,
                HttpServletResponse response) {
        if(listeners==null) return;
        if(app==null) return;

        for(Enumeration eu=listeners.elements();eu.hasMoreElements();)
         { Object o=eu.nextElement();
          if(eid==getEventID("WindowEvent")) {
                if(!(o instanceof WindowListener)) {
                    System.out.println("Listener is not of type 'WindowListener'
"+eid+",cid="+cid+",listener="+o);
                    return;
                }
                WindowListener wl=(WindowListener)o;
                String modifier=request.getParameter("windoweventtype");
                int type=stringToInt(modifier);

                Object wo=app.getApplicationVariable(cid);
                if(!(wo instanceof Window)) {
                    System.out.println("Event source object is not of type
'java.awt.Window' "+eid+",cid="+cid+",listener="+o);
                    return;
                }
                Window win=(Window)wo;
                WindowEvent event=new WindowEvent(win,type);
                if(type==WindowEvent.WINDOW_ACTIVATED)
wl.windowActivated(event);
                else if(type==WindowEvent.WINDOW_CLOSED)
wl.windowClosed(event);
                else if(type==WindowEvent.WINDOW_CLOSING)
wl.windowClosing(event);
                else if(type==WindowEvent.WINDOW_DEACTIVATED)
wl.windowDeactivated(event);
                else if(type==WindowEvent.WINDOW_DEICONIFIED)
wl.windowDeiconified(event);
                else if(type==WindowEvent.WINDOW_ICONIFIED)
wl.windowIconified(event);
                else if(type==WindowEvent.WINDOW_OPENED)
wl.windowOpened(event);
                else {System.out.println("Window event type="+type+", is not
handled");}

                System.out.println("processed window event...");
          }
        }
                }

}
```

FIG. 20